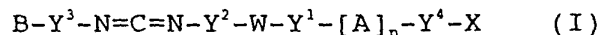


WHAT IS CLAIMED IS:

1. A fluorescent group-containing carbodiimide compound precursor having a halogen atom or a sulfonic acid group which is represented by the following general formula (I):



wherein,

X represents a halogen atom or a sulfonic acid group;

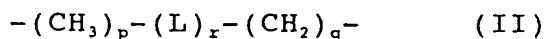
A represents a functional group selected from the group consisting of  $-CH_2-$ ,  $-NHCO-$ ,  $-CONH-$ ,  $-O-$ ,  $-S-$ ,  $-NR^1-$  wherein  $R^1$  represents a linear, cyclic or branched saturated or unsaturated aliphatic hydrocarbon group having 1-20 carbon atoms,  $-NR^2R^3-$  wherein  $R^2$  and  $R^3$  each independently represent a hydrogen atom, a linear or branched saturated or unsaturated aliphatic hydrocarbon group having 1-20 carbon atoms, or a cycloalkyl group, an aryl group or an aralkyl group which may have a substituent, provided that when one of  $R^2$  and  $R^3$  is a hydrogen atom, the other represents a linear or branched saturated or unsaturated aliphatic hydrocarbon group having 1-20 carbon atoms, or a cycloalkyl group, an aryl group or an aralkyl group which may have a substituent, or  $R^2$  and  $R^3$  may be bonded to each other to form as a whole a nitrogen-containing heterocyclic group which may contain an oxygen atom,  $-COO-$ ,  $-OCO-$ ,  $-NHSO_2-$ ,  $-NHC(S)NH-$  and  $-SO_2NH-$ ;

n represents 0 or 1;

W represents a direct bond or a quaternary onium

group;

$Y^1$ ,  $Y^2$ ,  $Y^3$  and  $Y^4$  each represent a functional group represented by the general formula (II):

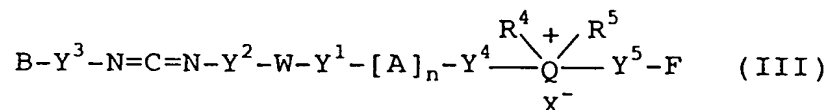


wherein, L represents a functional group selected from the group consisting of  $-CH_2-$ ,  $-NHCO-$ ,  $-CONH-$ ,  $-O-$ ,  $-S-$ ,  $-NR^1-$  wherein  $R^1$  has the same meaning as defined for the formula (I),  $-NR^2R^3-$  wherein  $R^2$  and  $R^3$  have the same meanings as defined for the formula (I),  $-COO-$ ,  $-OCO-$ ,  $-NHSO_2-$ ,  $-NHC(S)NH-$  and  $-SO_2NH-$ ; p and q each represent an integer of from 0 to 20; and r represents 0 or 1;

B represents a hydrogen atom or a monovalent organic group being either the same as or different from  $-W-Y^1-[A]_n-Y^4-X$  in the formula (I); and

any of the functional groups represented by B,  $Y^1$ ,  $Y^2$ ,  $Y^3$ ,  $Y^4$ , A and W may contain a group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

2. A fluorescent group-containing carbodiimide compound having at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom, which is represented by the following general formula (III):



wherein,

B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, A, X, W and n have the same meanings as defined for the general formula (I);

F represents a fluorescent group;

Q represents either a tertiary or quaternary nitrogen atom, or a tertiary or quaternary phosphorus atom;

R<sup>4</sup> and R<sup>5</sup> each independently represent a hydrogen atom, a linear or branched saturated or unsaturated aliphatic hydrocarbon group having 1-20 carbon atoms, or a cycloalkyl group, an aryl group or an aralkyl group which may contain a substituent, provided that when one of R<sup>4</sup> and R<sup>5</sup> is a hydrogen atom, the other represents a linear or branched saturated or unsaturated aliphatic hydrocarbon group having 1-20 carbon atoms, or a cycloalkyl group, an aryl group or an aralkyl group which may contain a substituent, or R<sup>4</sup> and R<sup>5</sup> may be bonded to each other to form a nitrogen-containing heterocyclic group or a phosphorus-containing heterocyclic group, which may contain an oxygen atom, as -Q<sup>+</sup>R<sup>4</sup>R<sup>5</sup>-;

Y<sup>5</sup> has the same meaning as defined for Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup> and Y<sup>4</sup>; and

at least one functional group selected from B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, Y<sup>5</sup>, A, W, R<sup>4</sup>, R<sup>5</sup> and F has at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have

substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

3. The fluorescent group-containing carbodiimide compound precursor according to claim 1, wherein at least one functional group selected from B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, A and W in the formula (I) has at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

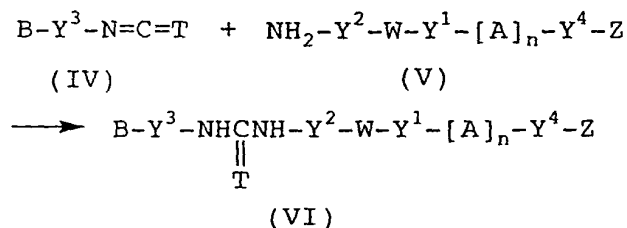
4. The fluorescent group-containing carbodiimide compound according to claim 2, wherein at least one functional group selected from B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, A and W in the formula (III) has at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

5. The fluorescent group-containing carbodiimide compound according to claim 2, wherein at least one functional group selected from Y<sup>5</sup>, R<sup>4</sup>, R<sup>5</sup> and F in the formula (III) has at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal,

an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

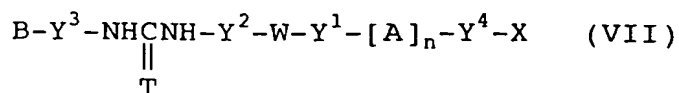
6. A method for producing the fluorescent group-containing carbodiimide compound precursor as defined in claim 1, which comprises the following steps (A), (B) and (C):

(A) a step of synthesizing a (thio)urea compound represented by the following general formula (VI) through a reaction of an iso(thio)cyanate compound represented by the following general formula (IV) with an amine compound represented by the following general formula (V):



wherein, B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, A, W and n have the same meanings as defined for the formula (I); T represents an oxygen atom or a sulfur atom; and Z represents a hydroxyl group, an alkyl group, an alkenyl group, a vinyl group, an allyl group, a phenyl group, a carboxyl group, a sulfonyl group-containing derivative group or a phosphonium group;

(B) a step of halogenating or sulfonating the compound represented by the general formula (VI) obtained in the step (A) to prepare a compound represented by the following general formula (VII):



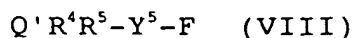
wherein, B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, W, A, n and X have the same meanings as defined for the formula (I); and T represents an oxygen atom and or a sulfur atom;

(C) a step of carbodiimidating the compound represented by the general formula (VII) obtained in the step (B) by dehydration or oxidative desulfurization reaction.

7. The production method according to claim 6, which produces the fluorescent group-containing carbodiimide compound precursor as defined in claim 3, wherein at least one functional group selected from B, Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, A and W has at least one group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

8. A method for producing the fluorescent group-containing carbodiimide compound as defined in claim 2, which comprises a step of:

selecting a carbodiimide compound and a fluorescent group-containing compound from the fluorescent group-containing carbodiimide compound precursor as defined in claim 1 and a fluorescent group-containing compound represented by the following general formula (VIII):



wherein,  $R^4$ ,  $R^5$ ,  $Y^5$  and  $F$  have the same meanings as defined for the general formula (III), and  $Q'$  represents a secondary or tertiary nitrogen-containing group or a secondary or tertiary phosphorus-containing group which may have substitution of a group selected from a hydroxyl group, an alkyl group, an alkenyl group, a vinyl group, an allyl group, a phenyl group, a carboxyl group, a sulfonyl group-containing derivative group and a phosphonium group, respectively, so that at least one of the carbodidimide compound and the fluorescent group-containing compound should have a functional group selected from a carboxyl group, a sulfo group, a phosphono group and a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom, to allow the carbodidimide compound and the fluorescent group-containing compound to react with each other.

9. The production method according to claim 8, which produces the fluorescent group-containing carbodiimide compound as defined in claim 4, wherein at least one functional group selected from  $B$ ,  $Y^1$ ,  $Y^2$ ,  $Y^3$ ,  $Y^4$ ,  $A$  and  $W$  has at least one group selected from a carboxyl group, a sulfo group, a phosphono group or a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

10. The production method according to claim 8, which produces the fluorescent group-containing carbodiimide compound as defined in claim 5, wherein at least one functional group selected from  $Y^5$ ,  $R^4$ ,  $R^5$  and F has at least one group selected from a carboxyl group, a sulfo group, a phosphono group or a phospho group which have substitution of an alkali metal, an alkaline earth metal or a basic group containing a nitrogen or phosphorus atom.

11. A method for detecting a nucleic acid by hybridization utilizing a nucleic acid labeled with a labeling substance, wherein the fluorescent group-containing carbodiimide compound as defined in claim 2 is used as the labeling substance.

12. The method according to claim 11, wherein the fluorescent group-containing carbodiimide compound as defined in claim 4 is used as the labeling substance.

13. The method according to claim 11, wherein the fluorescent group-containing carbodiimide compound as defined in claim 5 is used as the labeling substance.